PI: Frederick Wieland
Intelligent Automation, Inc. - Rockville, MD

Identification and Significance of Innovation

The key innovation of this project is the integration of diverse sources of air traffic information, from social media to flight data, into a web-based system in which *what-if* questions can be asked by stakeholders to better plan their use of the National Airspace System (NAS). The acronym summarizes the innovation nicely: Stakeholder Web-based Interrogable Federated Toolkit, or SWIFT. The innovation is *stakeholder-based*, that is, intended for use by either passengers or airlines or both. It is *web-based*, so the system can be accessed remotely. It is *interrogable*, that is, it can be interrogated using techniques from predictive analytics. It is *federated*, in that many diverse data sources and applications are integrated, or federated, into a seamless whole that answers the questions posed by PQL. It is a *toolkit*, in the sense that the system is a set of interoperating software. We propose to demonstrate the utility of these ideas through a sample analysis based on Trajectory-Based Operations.

Estimated TRL at beginning and end of contract: (Begin: 1 End: 2)

Technical Objectives and Work Plan

The technical objectives of the proposed Phase I work are as follows:
1. Gain stakeholder involvement in what types of information they would like to view on the SWIFT web-based application, including aviation-related social network trends and interrogations that they would like to perform on the system.
2. Develop the Predicted Query Language (PQL) as a front-end to model-based infrastructure systems such as SMART-NAS.
3. Develop a working prototype of the SWIFT on-line web service.

These technical objectives are achieved through the following proposed tasks:
1. Involve stakeholders through surveys and meetings
2. Prototype the web-based system
3. Develop PQL and demonstrate its use
4. Apply the technology and run a sample analysis (Trajectory-Based Operations)
5. Deliver the system to NASA
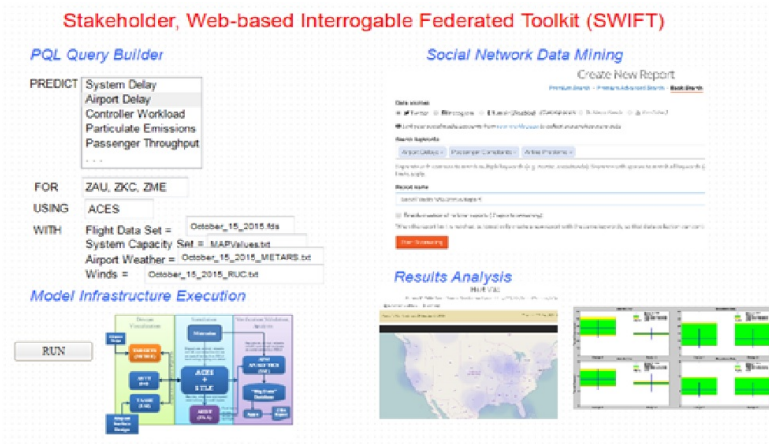
NASA Applications

Within NASA, the immediate application is as a useful user interface for the SMART-NAS system. The PQL statements provide a useful common language in which different analysts from different organizations, using both publicly-available as well as proprietary models, can communicate. The SWIFT system, with its embedded PQL, allows communication between researchers to occur in a manner heretofore difficult, if not practically impossible.

Non-NASA Applications

Outside of NASA, desktop analysis engines would become commonplace in the future. Database systems will be extended to include whole models to populate tables, and predictive query languages should become a standard. Data mining, which for now relies on existing data to predict trends, will be extended to include model-based predictions to create future data.

Firm Contacts

Mark James
Intelligent Automation, Inc.
15400 Calhoun Drive, Suite 190
Rockville, MD, 20855-2814
PHONE: (301) 294-5221
FAX: (301) 294-5201

NON-PROPRIETARY DATA